Standardized Engineering – How Communities of Interest Facilitate Global Knowledge Sharing

Breengaard, Lotte Christina; Jørgensen, Rasmus; Duncan, Samantha

Published in:
Proceedings of the 19th European Conference on Knowledge Management (ECKM 2018)

Publication date:
2018

Document Version
Peer reviewed version

Standardized Engineering – How Communities of Interest Facilitate Global Knowledge Sharing

Lotte Christina Breengaard, Director[1], Rasmus Jørgensen, Ph.D.[2] and Samantha Duncan, Project Manager[1]
[1]NNE, Virum, Denmark
[2]Implementation and performance management, DTU management, Kgs. Lyngby, Denmark

lcb@nne.com
rajor@dtu.dk
sdun@nne.com

Abstract

Communities of Practice can connect socially embedded knowledge with knowledge embedded in explicit form e.g. guidelines, however knowledge about how to intentionally develop CoP is incomplete. This study contributes with new knowledge by analyzing a case company that has worked with Communities for app. 10 years. NNE is a global engineering company that chose Communities of Interest (COI) is key initiative for realizing their key differentiator of having access to experts and sharing knowledge worldwide. The study deploys a single organization case study method and data were collected during a workshop with two company representatives. Using the Star model the study analyzes the COI organization and finds that the organization lack attention to people and rewards. The Star model is found useful for analyzing an existing Community organization as it provides insights into how coherent the current actions support the Communities; however frameworks tailored to analyze Communities must be applied to refine the results and to guide development actions.

Keywords: Communities of Practice, CoP, Communities of Interest, knowledge management, organizational learning

1. Introduction

Knowledge is important for an engineering organization's competitive advantage as reuse of past experience improves quality reduces risk, project cost, time and external cost. But knowledge is a complex phenomenon that is embedded socially and explicitly (Hislop 2013), and there is an inherent tension between developing new knowledge and exploiting what is already known (Crossan et al. 1999). Consequently managing knowledge in an engineering organization requires application of complementary methods that differ in their epistemic perspective, and methods that support and balance between exploration and exploitation.

Many organizations rely on written guidelines to document and distribute knowledge, and some organizations supplement the use of guidelines with communities of practice (CoP) to have complementary methods for managing knowledge. The combination of guidelines and communities improves knowledge sharing and guideline effectiveness (Fung-Kee-Fung et al. 2013; Schenkel & Teigland 2008). In communities employees who share an interest interact on an ongoing basis and deepen their knowledge and communities facilitate knowledge sharing through the social system of an organization (Wenger et al. 2002; Hislop 2013). Furthermore, by making communities responsible for updating guidelines communities impact beyond its participants and facilitates a connection between the social and structural embedded knowledge (Scarso et al. 2009; Schenkel & Teigland 2008; Aljuwaiber 2016). By connecting employees in

communities the individual and the organization is connected through the group of employees in a community. This connection paves the way for implementing individual ideas into the institutional knowledge repository, and for aligning individual knowledge with the institutional knowledge and exploiting the knowledge repository (Crossan et al. 1999). Because communities play a pivotal role in connecting the social and structural system and by connecting the individual with the organization communities could be of great significance of globally dispersed engineering companies. However despite the relevance of communities there is still a lack of knowledge about how organizations can develop communities intentionally (Aljuwaiber 2016).

This study contributes to the knowledge gap by investigating what characterizes a successful organization of COP, by comparing the Star model (Kates & Galbraith 2007) to how a global engineering company has organized their globally dispersed communities.

1.1 Case company

NNE is a global engineering company that specializes in the pharma industry and has approximately 2000 employees at 15 offices in Europe, China, India, and USA.

NNE has organized 20 global CoPs which they call Communities of Interest (COI) with members from around the world, and each of the 20 COIs represent a competence that has been identified by at least four countries as being a core competence for NNE. A COI is a global community of people who share an interest or a passion and a COI is formally responsible for knowledge sharing within their area of interest. The COIs are responsible for writing the global engineering standards, and implementing best engineering practice derived from projects throughout the world. COIs also maintain NNE's knowledge base and obtain answers to problems. Each COI consists of a chairman and several key members that share the responsibility of developing knowledge within their COI competence, and chairman and key members are highly respected specialists within their area and they participate voluntarily in the COI. Each COI also has numerous members (between 67 and 373) that follow the COI on the social platform 'Connect', and they are occasionally invited to contribute with new knowledge and review suggestions. NNE has around 2000 employees and 1783 employees are as a minimum a member of one COI. The COIs are governed by a COI board made up by management representatives from all countries and the COI board is responsible for the COI budget and strategy. The department for '*Best practice*' consists of internal consultants that support and develop the COIs. The COIs are a part of the overall strategy for NNE to become a world leading pharma engineering company that has a local presence and use the knowledge of experts around the world. The first COIs were established in 2008 and their activity and impact has been growing steadily since: 2017 saw a 25% increase in questions asked online (2017: 1053 questions) and 146 projects learnings were implemented.

2. Method

To answer the question of what characterizes the successful organization of intentionally developed communities the study deploys a single organization case study method. A case study method is chosen because the COP field lack theoretical foundation and NNE is chosen as case because of their decade of experience with CoP that is expected to contribute with answers to the *how, what, why* of COP development (Yin 2009). Data is collected from a workshop with two NNE representatives and the researcher which are also the three authors of the paper. LCB is the director of the Best practice

department and SDUN is an internal project manager. During the workshop RJ facilitated an analysis of the COI organization by going through the five categories of the Star model with LCB and SDUN.

Furthermore data from NNE's Social Network Enterprise system is collected to document COI activity and evaluate the effect of changes to the organization initiated in 2018, and to analyze the COI impact on performance and knowledge sharing. This data will be available for the conference.

3. Theory

The Star model describes five policy categories that management can control with the purpose of influencing employee behavior and the originating behavior then influences organizational performance and culture (Kates & Galbraith 2007). The five categories are strategy, people, rewards, processes, and structure:

Strategy: Is the organization's formula for achieving its goals. The strategy gives a direction by stating a mission and more specifically explains the customer value to offer and the specific sources of competitive advantage.

People: Determines the human policies that influence recruitment, selection, training, and development.

Rewards: Are the incentives provided to employees for behaving in support for the strategic goals.

Processes: Is the information and decision processes that is embedded across the organization's structure and these can be vertical and horizontal.

Structure: Determines how the decision taking power is distributed. Structure policies fall into four categories specialization, shape, distribution of power and departmentalization.

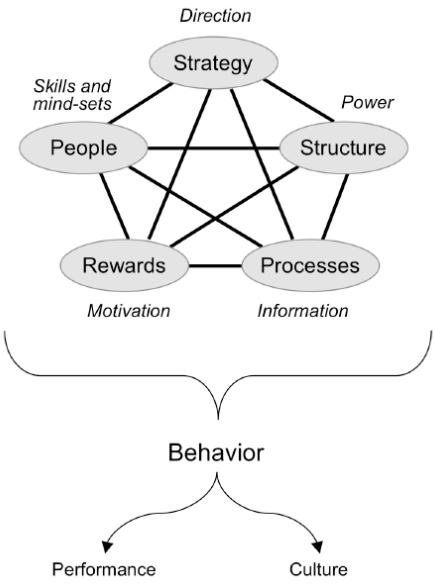

Figure 1 - The star model (Kates & Galbraith 2007)

The policy areas must be aligned and supplement each other for an organization to effectively support a strategy.

To characterize the organization of intentionally developed communities at NNE the organization is analyzed from each of the five policy categories.

4. Results

4.1 COI strategy

The NNE strategy for 2016-2018 states that the target is to become a pharma engineering company with local presence and have global industry expertise (Figure 2). NNE has two focus points related to knowledge explicitly in their strategy 'Master core competencies' and 'Activate best practice'. The motivation for the focus on knowledge is that NNE customers expect that NNE reuse learnings from previous projects to reduce the project cost and improve the quality of their engineering services, and customers also expect that NNE draw on the best people around the world to solve problems and design solutions.

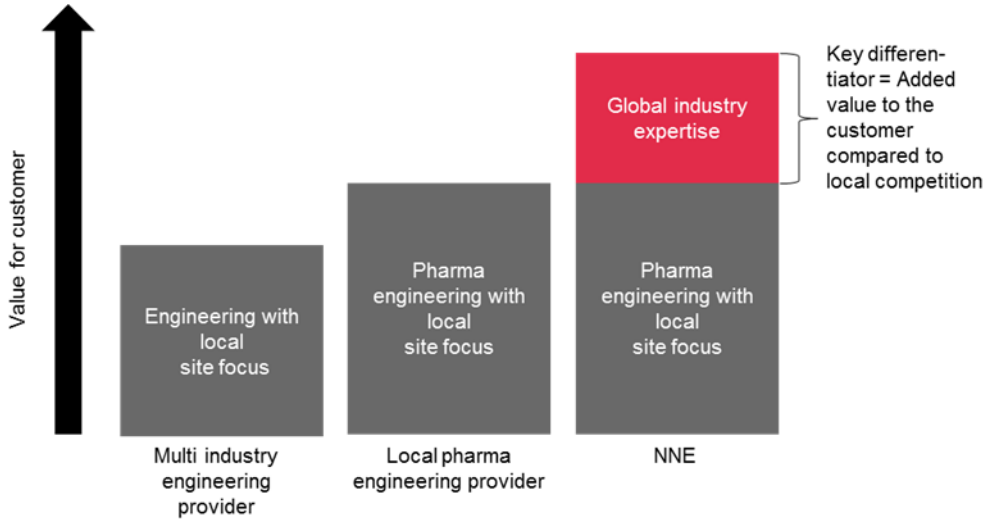

Figure 2: A key differentiator for NNE is to have access to experts worldwide and the COIs are a key factor in realizing the differentiator. The COIs are the only organization element on engineering level that connect offices globally, and the COIs improve engineering practice by implementing learnings from projects and define best in class engineering standards used globally. (Figure is adopted from an NNE strategy presentation)

4.2 COI Structure

Each COI has a chairman that is overall responsible for the COI and key member engagement, furthermore the chairman is responsible for the mainly administrative tasks of inviting to meetings, report on COI performance, maintain the dialogue with the COI board, and follow up on budget. The operations tasks of a COI e.g. answer questions, collect and implement learnings, update and develop standards, develop the COI focus competence are equally distributed among key members and chairman. This means that the power distribution is decentralized in the COI when it comes to core COI responsibility.

The relation between the COI board and the COIs is characterized as lateral with power centralized to the board that can influence budgets and the COI strategy.

Each COI represent a competence that has been recognized as a core competence by a majority of the countries and a COI is therefore considered comparable to a department that is formed around a competence and knowledge area. One important distinction is that membership of the COI is voluntary.

4.3 Processes

The relation between the COI board and the COI is characterized as a vertical process as the COI board dedicates resources to the COIs, decides to prioritize certain COIs, and the COI board holds the COI responsible for the COI KPIs. However since participation in the COI is voluntary then the process of allocating human resources is lateral and decentralized.

Each of the COI Board members have a larger responsibility for supporting 1-3 COI chairmen, and also a responsibility for supporting engagement among key members in own country. This responsibility comes with a "soft-power" mandate and can be characterized as vertical as this relationship is informal and supportive.

Internally the COIs are characterized by lateral processes and decentralized power because the participants share the responsibility of developing knowledge and bringing it to use, and the COI participants determines collectively and independently the direction and goal of the COI.

The relationship between the COIs and the employees is characterized as vertical and lateral. The vertical aspect stems from the decision power of the COIs to reject or implement a suggestion that is brought forward from an employee, meaning that the power to decide what is relevant or not is centralized within the COI. All employees have the opportunity to directly ask an expert within a competence area and this process is characterized as lateral. This dual relationship represents exploration and exploitation of organizational learning. Exploring new ways of working means rejecting or accepting ideas before potentially implementing it into the organizational knowledge, whereas exploitation of the existing knowledge relies on making it available for all employees through different approaches.

The Social Network Enterprise system 'Connect' plays a pivotal role in the lateral processes internally in the COI, between COI and employees and between employees. Via 'Connect' employees can ask questions to the COI or experts, the COIs can present new knowledge to all employees and employees can communicate directly with each other.

For the lateral process of suggesting an idea NNE relies on a database called 'LessonsLearned', where employees can propose ideas based on lessons learned from projects they participated in. Ideas are then communicated directly to the relevant COI that analyses the idea, communicate with the employee and either reject or integrate the idea into the organizational knowledge.

Employees also have access to knowledge from standard that describe how work activities either should or could take place. The standards are stored in a wiki (Called Ourwiki by NNE) and employees must be familiarized with the content to avoid non-conformities or to perform the work in the most efficient way. This relation between the employee and the institutionalized knowledge is characterized as vertical because employees are expected to work as the standards describe.

4.4 People

If an employee fulfill the requirements (recognized expert and 10 years of experience) for participating in a COI then the employee can choose to participate in a COI, and typically the line manager or a COI board member will approach an employee with the offer to become key member.

COI participation not is stated as a requirement for choosing one of the official career paths in NNE.

COIs are expected to seek new knowledge from external stakeholders to maintain a leading position within their competence area.

The COIs mentor new employees to the "NNE way of working" within their specific discipline during two meetings.

4.5 Rewards

Employees that choose to participate in a COI receive no monetary bonus for doing so.

Some COI chairmen have COI KPI's as their personal business KPI's however this is voluntary.

There are no rewards for line management to support employees in COI engagement

COI chairmen have in 2018 been acknowledged for their work, by being invited to a 2 day international meeting for the top 120 managers of NNE. This kind of acknowledgement is evaluated each year and most often there is no "reward".

5. Discussion

The COIs of NNE are comparable to COPs as employees participate because they are interested and knowledgeable with the COI competence area, and the employees have ongoing interactions where they deepen their expertise (Wenger et al. 2002). However the COIs are also responsible for deepening the expertise of the organization and the COIs therefore also interact with the organization, and contribute to the deepening of the collective knowledge of NNE. By making the COI responsible for developing knowledge and NNEs competence within an area, the COI chairmen, key members and members must have an interest in the specific area and in deepening their individual knowledge within this. But the participants must also have an interest in communication, facilitation of learning processes and distribution of knowledge. The latter aspect means that participants both are COI participants but also boundary spanners that reach beyond the COI and stay in contact with new knowledge (Wenger et al. 2002; Conklin et al. 2013). COI participants that actively share knowledge with employees during meetings or training seminars supports shared sense making and the collective acceptance of new knowledge (Huysman 2004) and is a complementary knowledge sharing approach to written standards. The dual knowledge centered role of both developing knowledge within an area and sharing knowledge with the organization is one of the differentiators between a team and a Community (McDermott & Archibald 2010).

The Star model of the organization for executing the NNE COI strategy is skewed towards processes and structure, and this skewedness is a consequence of too little emphasis on the people and rewards side, and less due to misalignment between the policy categories. Communities of Practice requires a soft hand approach to management (McDermott & Archibald 2010; Scarso et al. 2009) and the balance between lateral and vertical processes, voluntary participation, and the extended influence that COIs have over their activity reflects a soft hand approach.

To have a more balanced Star model the policy areas People and Reward requires an increase. Within the People area there is a lack of employee training in the COI systems (Connect, LessonsLearned, OurModel), training how to capture lessons learned during projects, and training COI participants in how to communicate and facilitate. Training would improve the user's ability to use COI systems and in turn presumably increase activity because users might refrain from sharing their knowledge if they consider the system too cumbersome or a unaware of it. The focus on technology user friendliness is found to be an important component of the Technological dimension of Community development (Scarso et al. 2009).

To further increase the People area COI participation could be made a part of a career path in NNE. However this could be in contrast to the intrinsic motivation associated with Community participation, as employees might participate a short period or not prioritize COI activity and reduce COI impact. The choice of NNE is similar to the organization of other Communities that rely on employees being motivated by the collaborative effort instead of an individual reward (Scarso et al. 2009).

The task of defining what is relevant knowledge or not has centralized power to define knowledge within NNE at the COIs, and if communities are too closed and conservative then there is a risk that Communities develop knowledge that is irrelevant or in opposition to the strategy (Huysman 2004). This risk could be mitigated by formalizing the collaboration between internal experts and COIs when implementing changes to engineering standards. Further, to maintain a leading position within their competence area COIs could be supported in identifying and collaborating with key stakeholder (e.g. universities, suppliers, customers) and increase meetings between COIs to facilitate the crossing of COI boundaries and cross-functional knowledge sharing (Wenger et al. 2002).

The organization of the COIs appear similar to what other scholars have described as an effective organization of Communities in an engineering organization (See Figure 3). The COIs is a resource that employees can contact for specific questions during a project, and the COI maintain the institutionalized knowledge by integration new knowledge (Scarso et al. 2009). By comparing the NNE COI organization with the four structural factors for community design we see the knowledge strategy of NNE is clearly stated and that COIs are a specific choice (Scarso et al. 2009). The organization further more touches upon all the dimension organizational, cognitive, economic, and technological, however in the NNE COI organization there is lack in the components 'cultural proximity of members' and 'mechanisms for establishing trust'. The COI members are spread around the globe and mainly interact virtually which is not beneficial for community performance (Schenkel & Teigland 2008). To improve COI performance physical meetings is an option that could improve cultural proximity and build trust (Scarso et al. 2009) and improve COI performance (Schenkel & Teigland 2008).

Figure 3: The four dimensions that must be considered in a community development project (Scarso et al. 2009)

The actions taken by NNE to organize their COIs are also comparable to the advice for organizing Communities; focus on issues important to the organization (This is done in the development phase by having the countries define COI competence areas), Establish community goals and deliverables (There are Yearly plans where the COI's play a major role), Provide real governance (There is a strong leadership connection through the COI board where a manager from each country is present), and Set high management expectations (COIs are key in realizing the key differentiator as mentioned in the strategy (See Figure 2)). (McDermott & Archibald 2010).

6. Conclusion

There is to some degree alignment between the strategy of NNE and the organizational design. NNE has connected its employees with global experts, made it possible for all employees to contribute with new knowledge, and also organized COIs as a focal point for exploring and integrating new knowledge while supporting the exploitation of new knowledge. The organization around the COIs balance between support and requirements and the 'Best practice' department is a nexus for these activities. However there is a lack of reward for participating in a COI, and also a lack of focus on how to support employees in engaging with the COI and participating in the processes.

There is a large body of knowledge about communities and future research should focus on testing and refining the frameworks. Moreover, future research could investigate how to sustain the employee interest in joining communities, how line managers prioritize resource allocation and support to the COIs, and how to facilitate cross-functional knowledge sharing in a global context. Future research could also study how The star model or explanatory frameworks (e.g. (Scarso et al. 2009; Verburg & Andriessen 2006)) could be applied for intentional CoP development in practice.

Using the Star model to analyze a CoP organization could be limited by the fundamental differences between CoP theory and the Star model. The Star model is used prescriptively which is in contrast to the "soft management" approaches of CoP, and by contrasting the results with other CoP explanatory frameworks (E.g. (Scarso et al. 2009)) new perspectives arise. Further, the study does not include the perspective of line managers or COI members, key members and chairmen which could further inform explore and refine the findings. However we argue that the Star model is useful for analyzing how balanced the organizational approach is and we consider the use of the Star model a new contribution for analyzing

Communities to ensure a balanced approach. The results of the study are limited by the single organization case study.

References

Aljuwaiber, A., 2016. Communities of practice as an initiative for knowledge sharing in business organisations : a literature review. *Journal of Knowledge Management*, 20(4), pp.731–758.

Conklin, J. et al., 2013. Knowledge brokers in a knowledge network: the case of Seniors Health Research Transfer Network knowledge brokers. *Implementation Science*, 8(1), p.7.

Crossan, M.M., Lane, H.W. & White, R.E., 1999. An Organizational Learning Freamwork: From Intuition to Institution. *Academy of Management Review*, 24(3), pp.522–537.

Fung-Kee-Fung, M. et al., 2013. Piloting a regional collaborative in cancer surgery using a "community of practice" model. *Current Oncology*, 21(1), p.27.

Hislop, D., 2013. *Knowledge Management in Organizations - A Critical Introduction* Third ed., New York: Oxford University Press.

Huysman, M., 2004. Communities of practice: facilitating social learning while frustrating organizational learning. *Organizations as knowledge systems: knowledge, learning, and dynamic capabilities*, (Journal Article), pp.67–85.

Kates, A. & Galbraith, J.R., 2007. *Designing Your Organization: Using the STAR Model to Solve 5 Critical Design Challenges*, Jossey-Bass.

McDermott, R. & Archibald, D., 2010. Harnessing Your Staff's Informal Networks. *Harvard Business Review*, 88(3), pp.82–89.

Scarso, E., Bolisani, E. & Salvador, L., 2009. A systematic framework for analysing the critical success factors of communities of practice. *Journal of Knowledge Management*, 13(6), pp.431–447.

Schenkel, A. & Teigland, R., 2008. Improved organizational performance through communities of practice. *Journal of Knowledge Management*, 12(1), pp.106–118.

Verburg, R.M. & Andriessen, J.H.E., 2006. The assessment of communities of practice. *Knowledge and Process Management*, 13(1), pp.13–25.

Wenger, E., Snyder, W.M. & McDermott, R., 2002. *Cultivating communities of practice : a guide to managing knowledge*, Boston, MA: Harvard Business Press.

Yin, R.K., 2009. *Case study research: Design and Methods*,